

# Solve a Problem: Reconcile a Household Budget

Very Imaginative People Enterprises 2011

A relevant, real-world application for math is solving a budgeting problem. Students make a real-world decision, analyzing income and expenses, weighing their spending options, and ultimately deciding whether to make a large expenditure or not. Teaching students to use math and problem-solving skills within the context of a real life problem helps them understand the role of math in everyday life.

Using a spreadsheet helps students experiment with and compare different financial scenarios. Through an exercise like this, students are able to analyze financial data, arrive at a conclusion, and back up that decision with solid reasoning based on mathematical facts.

# Project Summary

- Produce a budget for household expenditures
- Plan for a vacation and estimate the costs

As part of a lesson in math or career planning, students produce a budget to evaluate their household expenditures. Students choose which purchases to make in order to balance their budget. By using Numbers, students can quickly compare spending scenarios on a single spreadsheet.

In order to deepen student knowledge and augment the exercise, you can introduce several variables. Students can select a career and ascertain the average salary for that particular job. You can also introduce unexpected variables that affect the student's savings, such as home repairs, job bonuses, or an unexpected medical expense.

Once the initial budget is built, students pick a vacation destination and estimate the costs associated with their intended trip. They create a savings plan for the trip, and design a poster using Pages to track their savings progress. Finally, they defend their decision as to whether the trip is affordable or not.

# Learning Objectives (Academic)

- Develop a logical approach for solving problems.
- Use critical thinking to make decisions between different options.
- Evaluate the fiscal impact of decisions about career and spending.
- Work in a partner setting, sharing responsibilities and learning to compromise to successfully complete the project.
- Analyze financial data, then create a summary report that clearly presents the group's decisions and rationale.

# Learning Objectives (Technical)

- Use the Internet to evaluate different cost options for products and services.
- Use a spreadsheet to model and evaluate the financial scenarios.
- Use Numbers to calculate individual costs of items.

# Student's Role

- Organizing the products of the lesson.
- Researching careers and average salaries.
- Deciding on expenditures for their annual budget.
- Gathering and organizing their financial scenarios.
- Creating a short summary report to accompany their data.

Students design their approach to the lesson, including the following:

Organizing the products of the lesson.

Researching careers and average salaries.

Deciding on expenditures for their annual budget.

Gathering and organizing their financial scenarios.

Designing a progress-tracking poster.

Creating a short summary report to accompany their data.

With the teacher's guidance, the students should create a rubric to assess the outcomes of the project.

# Teacher's Role

- The ability of the student pairs to work collaboratively and make effective compromises regarding household budget.
- The use of the writing process for the creation of the group's summary document.
- The use of spreadsheets to calculate costs associated with different scenarios.
- The use of modeling tools to display the financial options.

Determine the criteria for evaluation of student's work throughout the project and explain how you will assess the parts of the project, including:

The ability of the student pairs to work collaboratively and make effective compromises regarding household budget.

The use of the writing process for the creation of the group's summary document.

The use of spreadsheets to calculate costs associated with different scenarios.

The use of modeling tools to display the financial options.

Be sure to explain to students how you will evaluate their ability to reach the goals and objectives of the project, as judged by the final product.

# Teacher Planning

- Numbers
- Pages
- Websites
- Resources
- Time

In order for the lesson to succeed, the teacher will need a working knowledge of the technology and resources the students will use:

The basic functionality of Numbers, the spreadsheet application included with iWork

The basic functionality of Pages, the word-processing application included with iWork

Identify websites ahead of time that show the different expenses associated with the lesson.

These should include utilities, real estate, auto, etc. Where possible, use local expenses, as national averages may not be realistic for your area of the country.

Identify resources students can use to investigate careers and related salaries. For jobs that require advanced training, be sure to have students calculate financial loan costs.

Ensure that the necessary hardware and software are available to the students.

Determine the amount of time to be spent on the project. Provide guidelines for project milestones. For example, how much time the students should spend deciding on their vacation destination.

# Student Prep

- Numbers
- Pages
- Possible careers

## Student Preparation

Tell the students the lesson objectives in advance, so they have time to prepare.

Give students time to explore Numbers and Pages.

Have students think about possible career options in advance.



# Introducing the Project

- Discussion on Budgets
- Group assignment
- Variables

The first step is to discuss the role that budgets play in households. Open the existing budget template in Numbers and print out enough copies for your class. Lead a discussion as you evaluate the different categories on the budgeting worksheet. Be sure that students understand how different items work together in determining household budgets. Next, pair the students into groups of two. These student groups will evaluate several criteria in balancing their budgets. Their first job will be to determine their fictitious career paths. You can vary the complexity of the tasks in this project and adapt them to match your educational goals and time constraints. For example, the lesson can be streamlined for a math class, with the number variables simplified to expedite the project. On the other end, in a career development course, students can do more research into their career options and choose between multiple career paths.

# Select a career

- Job pool
- Job search

There are several ways to implement this first task. It is up to you what constraints you place on the students' career selection process. Here are two scenarios you can use, depending upon your goals for the lesson.

## Job Pool

Offer a pool of different jobs to select from. Working in pairs, students can randomly draw a career from the pool. You can choose to give students information about the salary of the jobs as well as provide information about the cost of education. This is a good approach if you want to streamline this first stage.

## Job Search

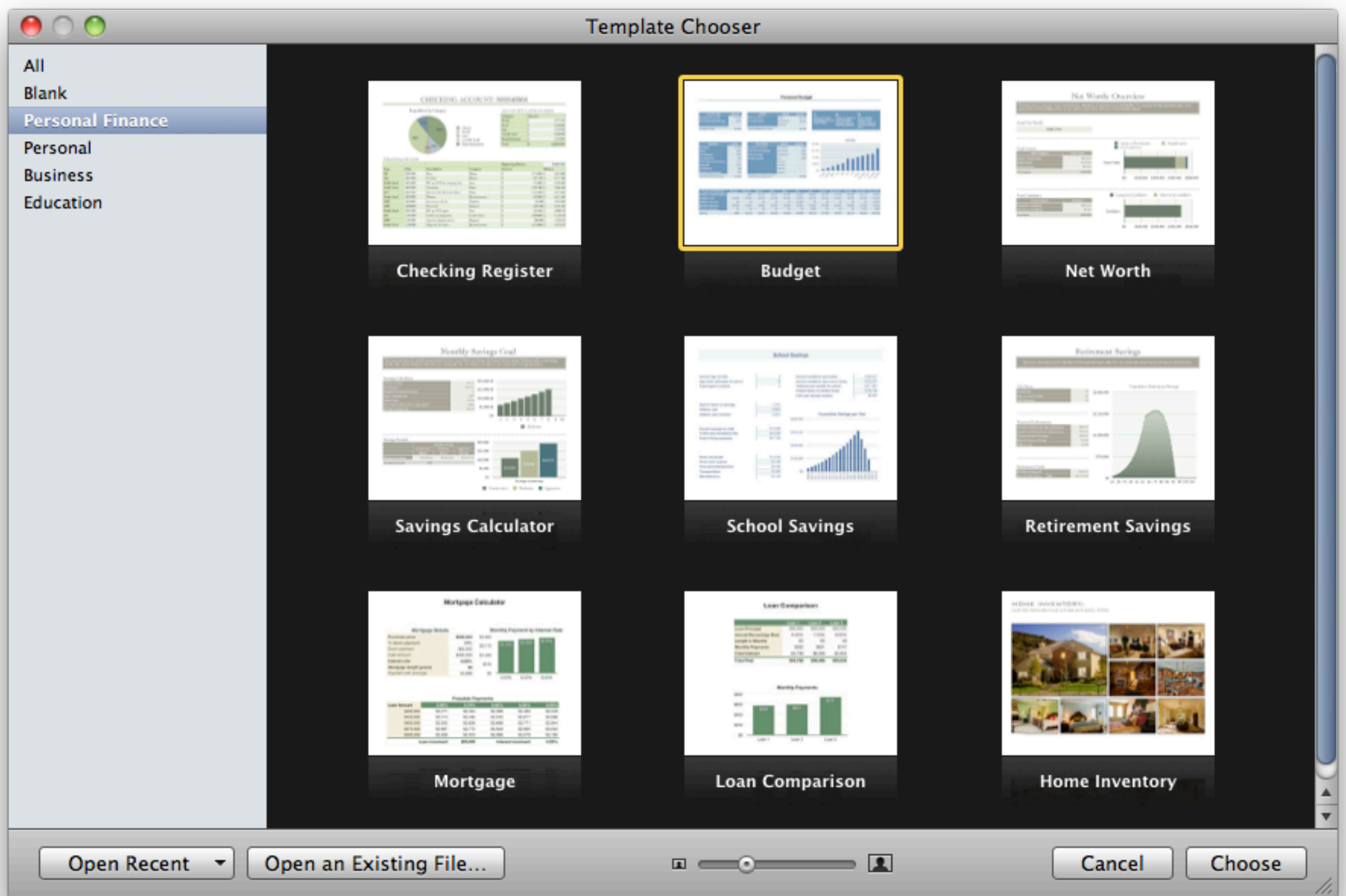
Let the students, working in pairs, choose careers based upon their interests and goals. Be sure the students choose job categories that are broad enough to support salary research, and that they research the average salary associated with their desired jobs.

# Create a personal budget worksheet

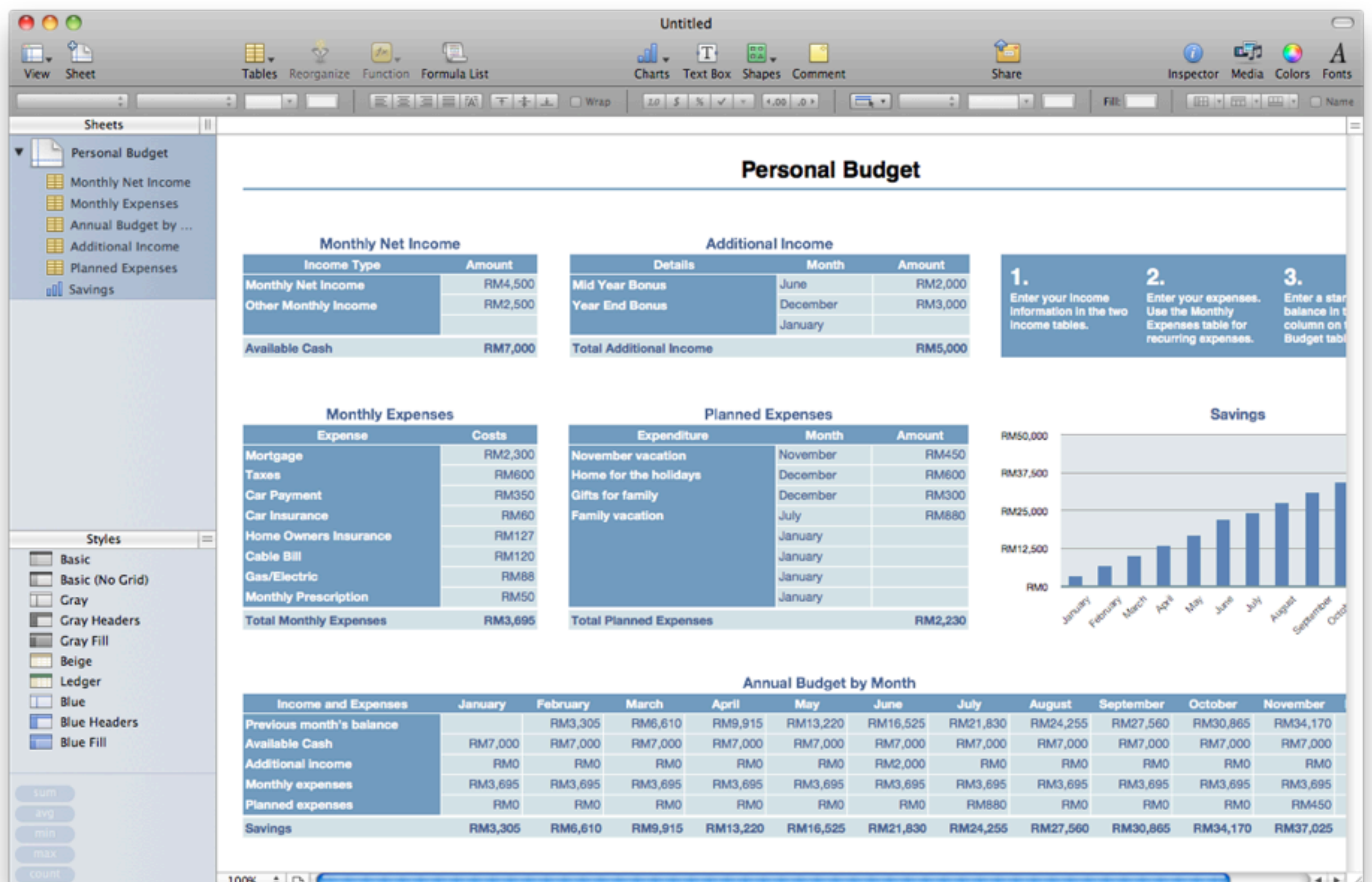
After adequately researching their careers, students should create a personal budget worksheet to balance their household budget. Fortunately, Numbers offers an easy-to-use template that only needs a little bit of customization. The students can use Numbers to list and organize their expenses throughout the exercise.



Launch the Numbers application. Depending on your computer's setup, you'll either find Numbers located in the computer's Dock or by navigating to the iWork folder inside your Applications folder.

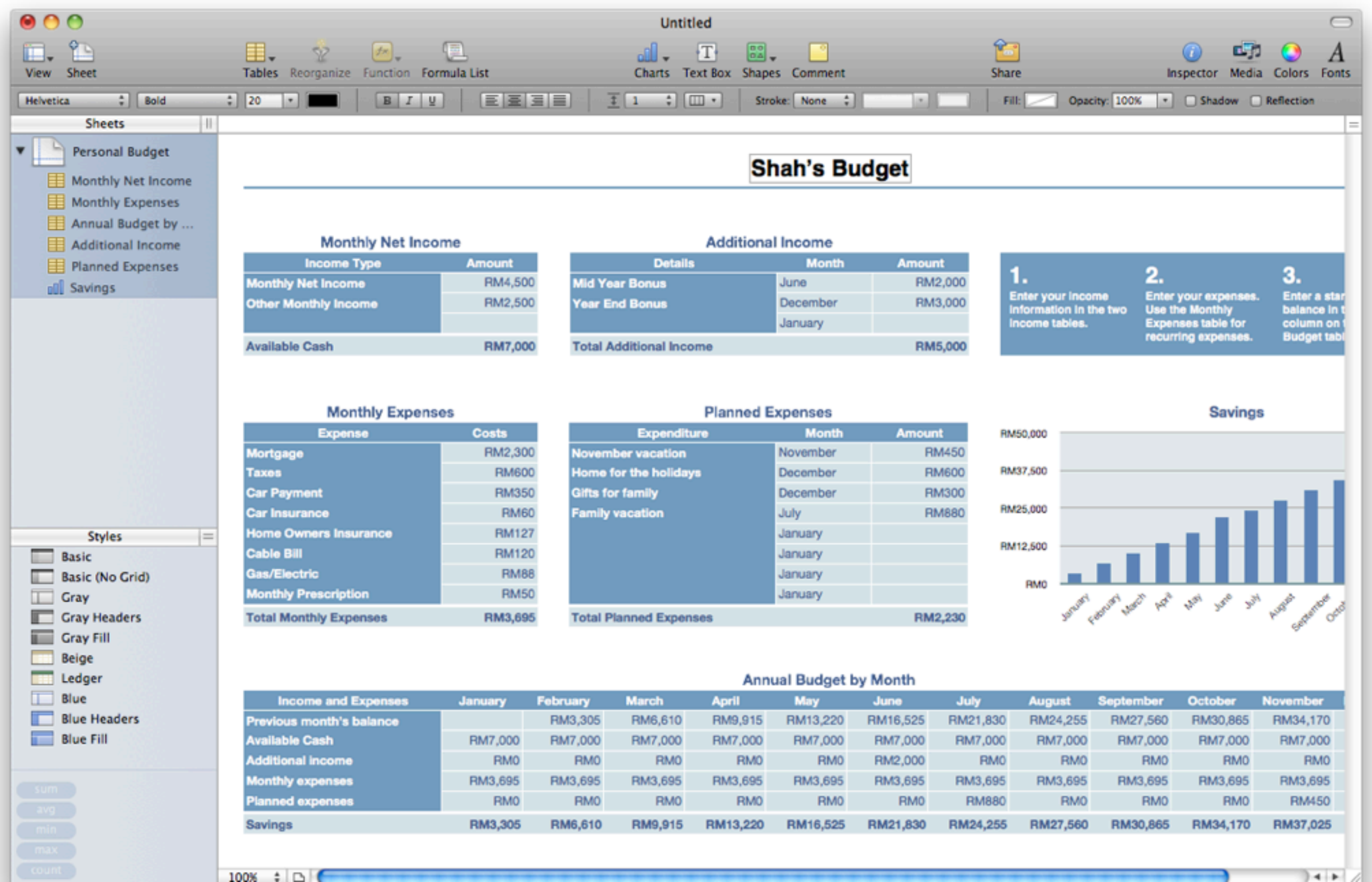


From the Template Chooser, select the Budget template and click Choose.



A new document opens. This is a budget that can be adapted to work for the students' exercise. It will need to be reformatted slightly.





Change the title to your name

Sheets

▼

Personal Budget

Monthly Net Income

Monthly Expenses

Annual Budget by ...

Additional Income

Planned Expenses

Savings

Monthly Net Income

Income Type	Amount
Monthly Net Income	RM4,500
Other Monthly Income	RM2,500
Available Cash	RM7,000

Click the Monthly Net Income table to select it.



Monthly Net Income

Income Type	Amount
Monthly Net Income	RM3,000
Other Monthly Income	RM0
Available Cash	RM3,000

Enter the household income for monthly net income.  
If a formula is needed, use something like this (Job A and Job B here represent the annual salary earned by each member of the group):  
= (Job A + Job B)/12

Untitled

View Sheet Tables Reorganize Function Formula List Charts Text Box Shapes Comments

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Wrap 10 \$

**Shah's Budget**

**Additional Income**

Details	Month	Amount
Mid Year Bonus	June	RM2,000
Year End Bonus	December	RM3,000
	January	
<b>Total Additional Income</b>		<b>RM5,000</b>

Click the Additional Income table to select it.

### Additional Income

Details	Month	Amount
Mid Year Bonus	June	RM1,000
Year End Bonus	December	RM1,000
	January	
Total Additional Income		RM2,000

Enter expected revenue (if any) not covered by the group’s salary. This can include bonuses, financial investments, or part-time jobs. Let students know that they can revisit this additional revenue later in order to balance their budget, but must be able to justify the amount of money entered.

# Calculate Monthly Expenses

Balancing a budget requires that the students make decisions about how to spend their money. Have the students generate a list of monthly expenses that they expect to incur. They can use the list of expenses in the budget template as a starting point, but should also generate their own items and costs. Students should be prepared to cite their sources when assigning costs. The Internet is a useful tool for checking costs.

Monthly Expenses

Expense	Costs
Mortgage	RM2,300
Taxes	RM600
Car Payment	RM350
Car Insurance	RM60
Home Owners Insurance	RM127
Cable Bill	RM120
Gas/Electric	RM88
Monthly Prescription	RM50
Total Monthly Expenses	RM3,695

Planned Expenses

Expenditure	Month	Amount
November vacation	November	RM450
Home for the holidays	December	RM600
Gifts for family	December	RM300
Family vacation	July	RM880
	January	
	January	
	January	
	January	
Total Planned Expenses		RM2,230

Select the Monthly and Planned Expenses tables.

Monthly Expenses	
Expense	Costs
Total Monthly Expenses	
RM0	

Planned Expenses		
Expenditure	Month	Amount
Total Planned Expenses		
		RM0

Delete all values in the Amount column for both Monthly and Planned Expenses tables. (Select using the mouse and press Delete on the keyboard).



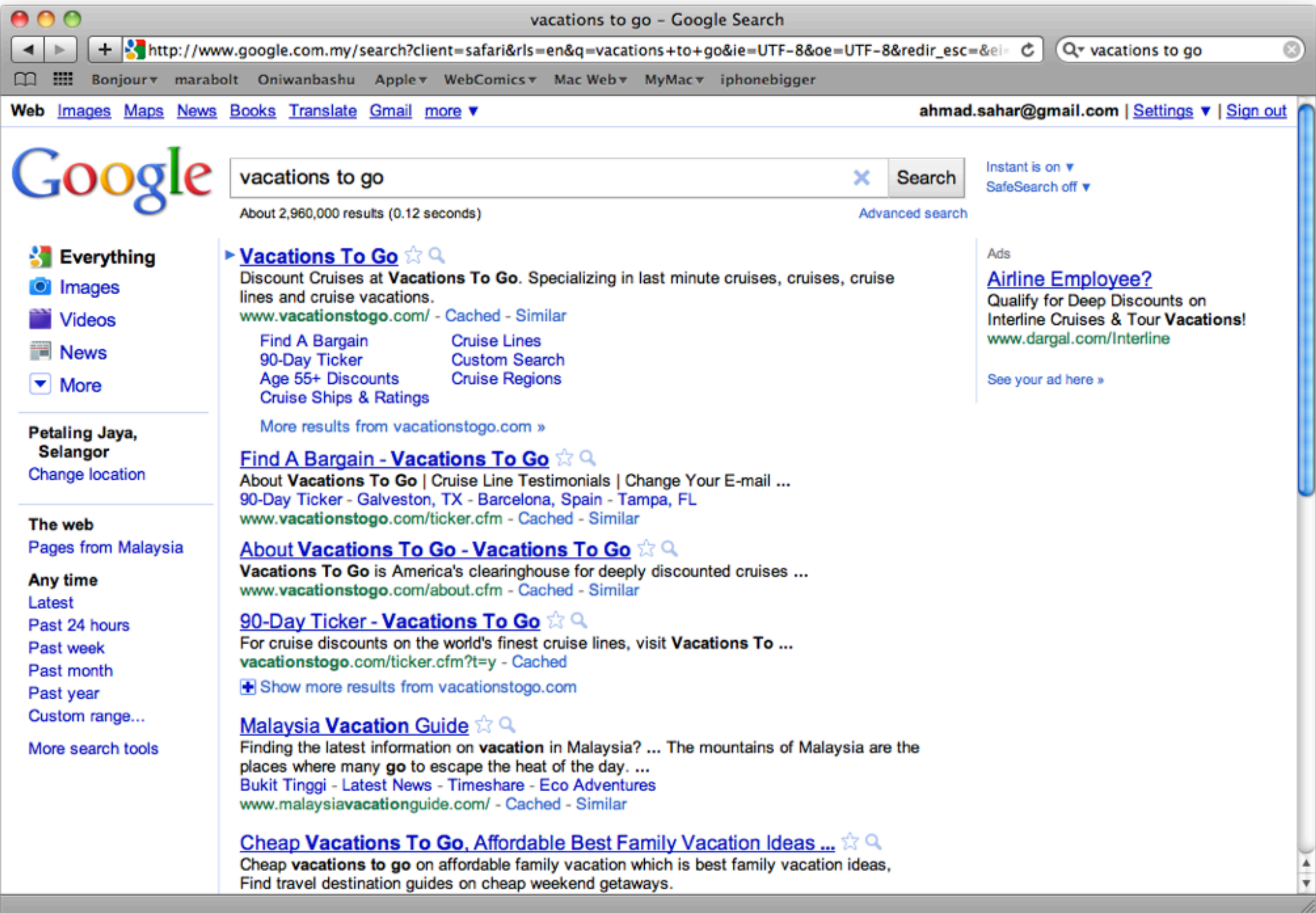
Monthly Expenses	
Expense	Costs
House Payment	RM1,200
Car Payment	RM800
Food	RM500
Total Monthly Expenses	RM2,500

Determine your monthly expenses.  
 Students should research the costs for things like mortgages, car insurance, and utility bills.  
 Click the Monthly Expenses table to select it.  
 Enter your expenses for the categories listed or modify the list. If additional rows are needed, choose Table > Add Row Below.  
 Be sure to check that the Total Monthly Expenses formula calculates all costs.

# Determine Vacation Plans

Next, have the students determine how much money they have left over, and plan a vacation accordingly. You may want to have students create an additional spreadsheet to total the costs of their trip.





Be sure students account for the following categories on their trip:

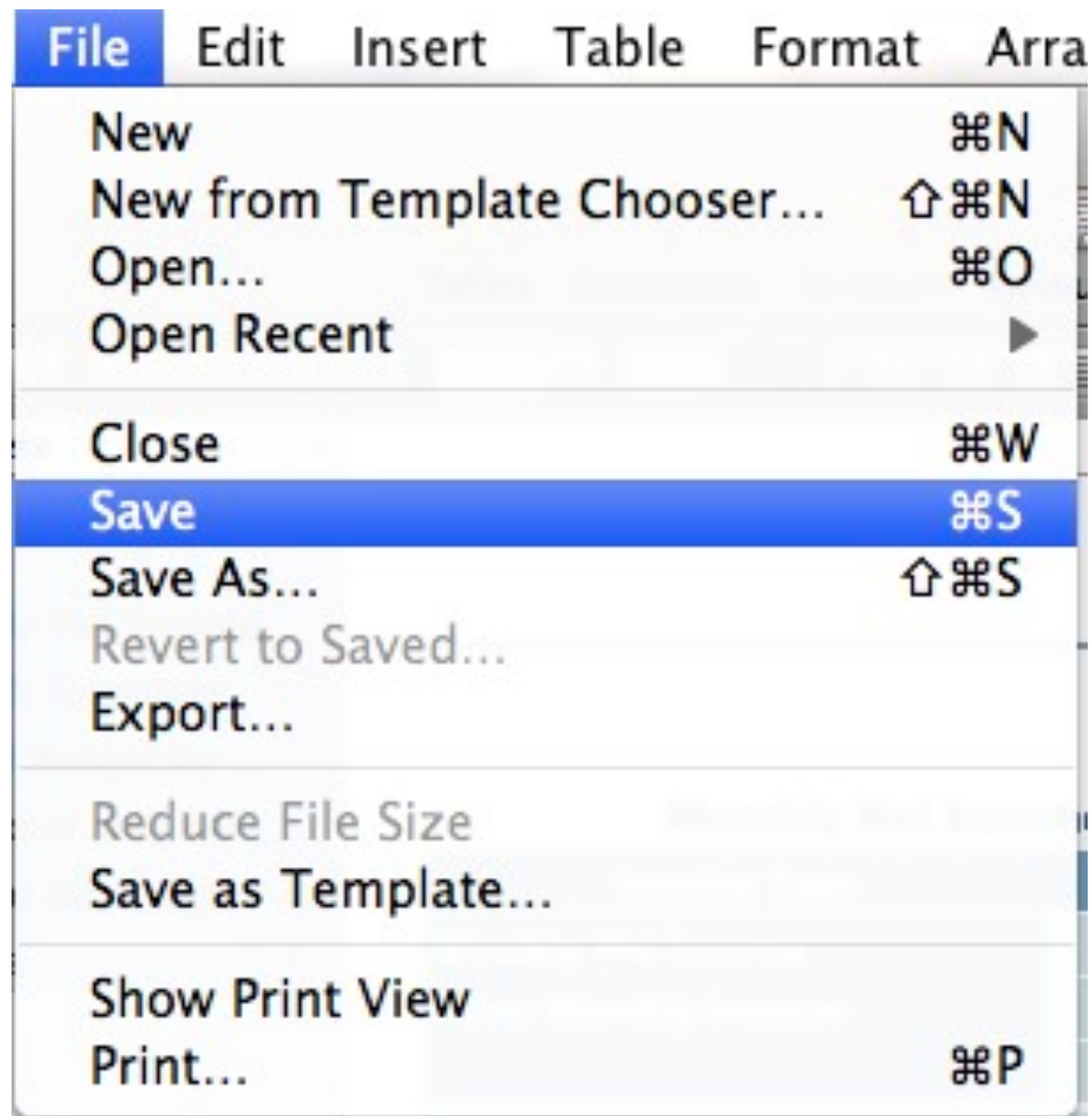
- Lodging
- Air Transportation
- Ground Transportation
- Meals
- Entertainment

### Planned Expenses

Expenditure	Month	Amount
Air Transport	November	RM400
Ground Transport	November	RM100
Lodging	November	RM360
Meals	November	RM300
Entertainment	November	RM300
Total Planned Expenses		RM1,460

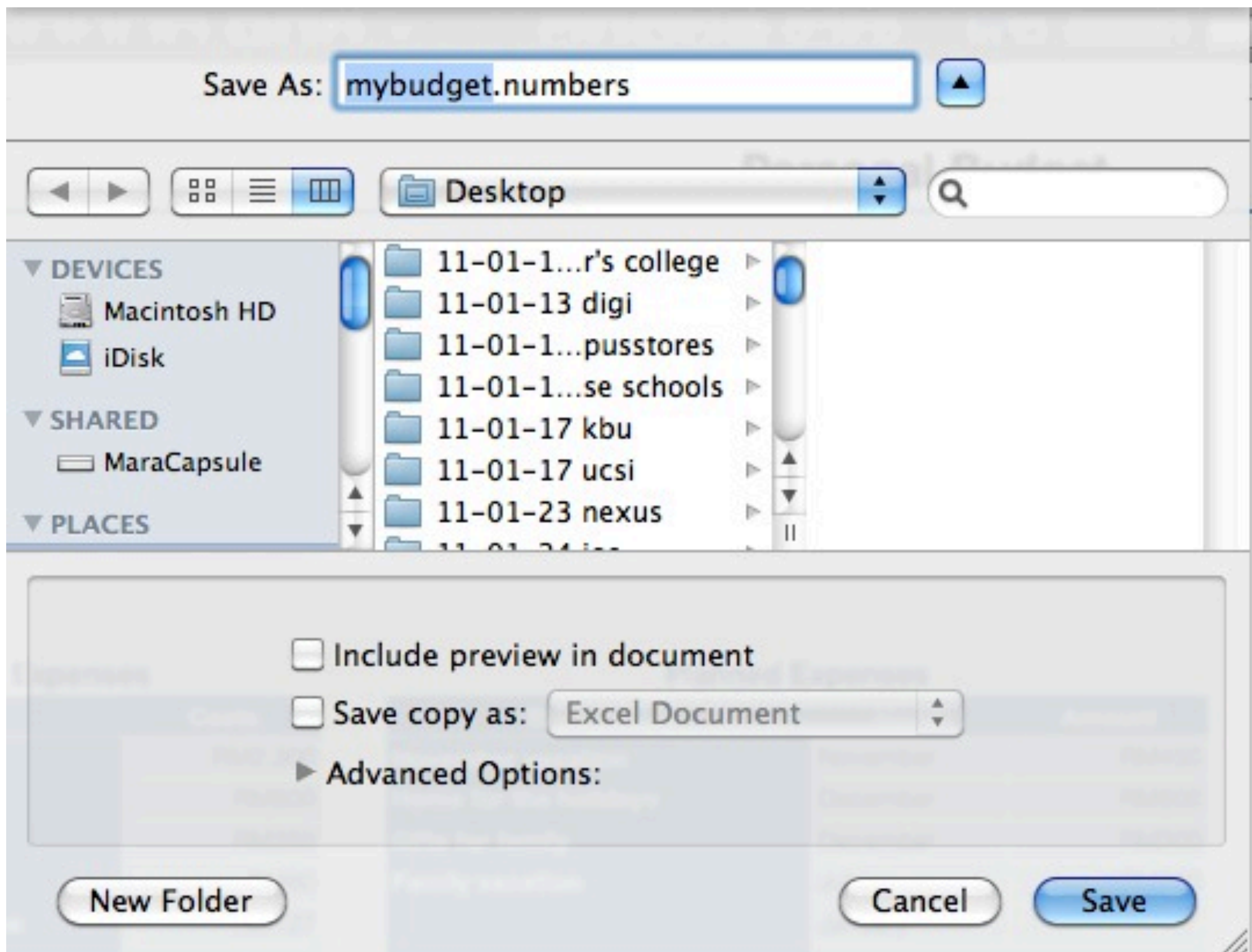
Once a vacation amount is calculated, have students enter it into the Planned Expenses table. Click the Planned Expenses table to select it. Students should enter all additional expenses they anticipate incurring. Ensure that the budget is balanced and adequate funds are in savings.

Saving



Choose Save from the File menu





Save the file to the Desktop using the student's own name. Email, iChat or pass to the instructor on thumbdrive.

# Submission

- Submit Numbers files
- Submit summary document

Once the student groups have completed their budgets, have them submit the Numbers files for grading. Be sure to have students check their formulas before submitting. The final item that students should include in their package for grading is a short summary document. Have the group discuss and defend their decision regarding expenses, income, and their planned trip. Depending on the age and ability level of the students, the summary will vary in length. The teacher should set clear guidelines on the expected length of the summary. For middle school and high school students, a two-page summary could be expected. Additionally, have students provide a list of sources used to determine values of expenses and revenues.

# Assessment

- Group performance
- Follow up activities
- Self assessment

There are several ways to evaluate the student's performance for the lesson. Be sure to evaluate all aspects of the project, looking at the ability to solve a problem, as well as the technical presentation of the information.

Assess the students' overall performance as a group.

Invite discussion, journal entries, or other follow-up activities regarding the project to assess the effectiveness of individual group members in creating the commercial.

Have students complete self-assessment rubrics to justify their achievements in making a case.

**Thank you**